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# PATENT ABSTRACTS OF JAPAN

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Search

(21)Application number : 09-126514

(71)Applicant : ANELVA CORP

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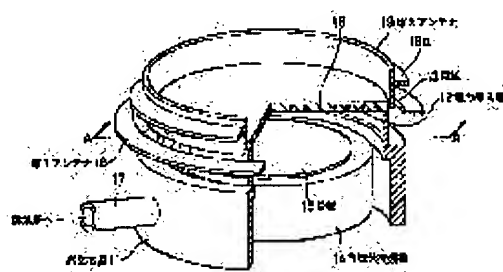
(72)Inventor : TAKAGI KENICHI

## (54) PLASMA TREATMENT DEVICE

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a plasma treatment device using an inductively coupled plasma source, in which cleaning time is shortened by spattering efficiently an electric power introducing window during cleaning, plasma generating efficiency is enhanced during processing and economical processing is carried out.

**SOLUTION:** This device is equipped with a discharge container consisting of a power introducing window 12 and an electrode 13, a vacuum container 11 coupled communicatingly with the discharge container, a plasma generating mechanism, an exhausting mechanism, a gas introducing mechanism and a base plate supporting mechanism 14 mounted closely within the discharge container. The plasma generating mechanism is equipped with a first antenna 18 for processing, which is fixed to the periphery of the power introducing window and has a small antenna area, and a second antenna 19 for cleaning, which is provided movably against the power introducing window and has a large antenna area. It is structured that the second antenna is separated from the power-introducing window when processing, the approaches the power-introducing window when cleaning while it touches the first antenna.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

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examiner's decision of rejection or application  
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## \*NOTICES\*

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## CLAIMS

## [Claim(s)]

[Claim 1] The electric discharge container which consists of an electrode which stopped the end of a power introduction aperture and this power introduction aperture. The aforementioned electric discharge container and the vacuum housing opened for free passage. The plasma production mechanism in which plasma is generated with the aforementioned electric discharge container. The exhaust air mechanism which maintains the interior of the aforementioned vacuum housing at a reduced pressure state. The gas introduction mechanism which introduces reactant gas into the interior of the aforementioned vacuum housing, and the substrate maintenance mechanism which opens a predetermined interval to the aforementioned electrode, is made to approach the building envelope of the aforementioned electric discharge container, and is installed in the aforementioned vacuum housing. It is plasma treatment equipment equipped with the above. the aforementioned plasma production mechanism The 1st antenna for processes with a small antenna area fixed to the circumference of the aforementioned power introduction aperture, It has the 2nd antenna for large cleaning of the antenna area prepared free [ movement ] to the aforementioned power introduction aperture. the 2nd antenna of the above At the time of a process, it separates from the aforementioned power introduction aperture, and the aforementioned power introduction aperture is approached at the time of cleaning, and it is characterized by contacting the 1st antenna of the above electrically.

[Claim 2] The aforementioned power introduction aperture is a cartridge substantially, and the 1st antenna of the above is substantially annular. When [ at which the 2nd antenna of the above has the annular section in a periphery side ] it is a cartridge-like substantially, the 2nd antenna of the above is freely movable to the shaft orientations of the aforementioned power introduction aperture and the 2nd antenna of the above approaches the aforementioned power introduction aperture, The 2nd antenna of the above is plasma treatment equipment according to claim 1 characterized by being constituted so that it may be inserted between the aforementioned power introduction aperture and the 1st antenna of the above and the aforementioned annular section may contact the 1st antenna of the above.

[Claim 3] The aforementioned power introduction aperture is a cartridge substantially, and the 1st antenna of the above is substantially annular. the 2nd antenna of the above When it can consist of a wall which makes a big antenna area, and an outside lobe which forms the slot which holds the 1st antenna of the above in the medial surface of this wall, and it can move in the direction of a path of the aforementioned power introduction aperture freely and the 2nd antenna of the above approaches the aforementioned power introduction aperture, The 1st antenna of the above is plasma treatment equipment according to claim 1 characterized by being constituted so that it may hold in the aforementioned slot of the 2nd antenna of the above in the state of contact and the aforementioned wall may counter the aforementioned power introduction aperture.

[Claim 4] The aforementioned power introduction aperture is a semi-sphere configuration or its part substantially, and the 1st antenna of the above is substantially annular. the 2nd antenna of the above When it has a semi-sphere configuration or some of its configurations substantially, and it can move in the vertical direction freely to the aforementioned power introduction aperture and the 2nd antenna of the above approaches the aforementioned power introduction aperture, The 2nd antenna of the above is plasma treatment equipment according to claim 1 characterized by being constituted so that the aforementioned power introduction aperture may be covered and the part may contact the 1st antenna of the above.

[Claim 5] A vacuum housing equipped with a plate-like power introduction aperture. The plasma production mechanism in which plasma is generated within the aforementioned vacuum housing. The exhaust air mechanism which maintains the interior of the aforementioned vacuum housing at a reduced pressure state. The gas introduction mechanism which introduces reactant gas into the interior of the aforementioned vacuum housing. The substrate maintenance mechanism which is made to approach an electric discharge field and is installed in the aforementioned vacuum housing. It is plasma treatment equipment equipped with the above, the aforementioned plasma production

mechanism has the 1st antenna and the 2nd antenna, and the 1st antenna of the above is substantially annular. the 2nd antenna of the above It consists of the monotonous section which covers the aforementioned power introduction aperture, and an outside lobe which forms the circular-sulcus section which holds the 1st antenna of the above in the opposite side of this monotonous section. When it can move in the direction which intersects perpendicularly with the aforementioned power introduction aperture freely and the 2nd antenna of the above approaches the aforementioned power introduction aperture, it is characterized by being constituted so that the 1st antenna of the above may be held in the aforementioned slot of the 2nd antenna of the above in the state of contact and the aforementioned monotonous section may counter the aforementioned power introduction aperture.

[Claim 6] The electric discharge container which consists of an electrode which stopped the end of a power introduction aperture and this power introduction aperture. The aforementioned electric discharge container and the vacuum housing opened for free passage. The plasma production mechanism equipped with the antenna which generates plasma with the aforementioned electric discharge container. The exhaust air mechanism which maintains the interior of the aforementioned vacuum housing at a reduced pressure state. The gas introduction mechanism which introduces reactant gas into the interior of the aforementioned vacuum housing, and the substrate maintenance mechanism which opens a predetermined interval to the aforementioned electrode, is made to approach the building envelope of the aforementioned electric discharge container, and is installed in the aforementioned vacuum housing. It is plasma treatment equipment equipped with the above. the aforementioned antenna of the aforementioned plasma production mechanism The 1st electrical-and-electric-equipment path section annular on the real target whose inner circumference the aforementioned power introduction aperture is surrounded and is a polygon-like, It consists of the 2nd electrical-and-electric-equipment path section which consists of two conductive rectangle boards attached in each side portion of this 1st electrical-and-electric-equipment path section on the conductive ginglymus. at the time of a process Area which makes perpendicular the aforementioned 2nd electrical-and-electric-equipment path section to the outside surface of the aforementioned power introduction aperture, and counters the aforementioned power introduction aperture of the aforementioned antenna is made small. at the time of cleaning It is characterized by being constituted so that area which covers the circumference of the aforementioned power introduction aperture and counters the aforementioned power introduction aperture of the aforementioned antenna by making parallel the aforementioned 2nd electrical-and-electric-equipment path section to the outside surface of the aforementioned power introduction aperture may be enlarged.

[Claim 7] Plasma treatment equipment according to claim 6 characterized by forming the cross-section configuration of the aforementioned 1st electrical-and-electric-equipment path section, and the cross-section configuration of the aforementioned 2nd electrical-and-electric-equipment path section so that the portion by the side of the aforementioned power introduction aperture may become sharp.

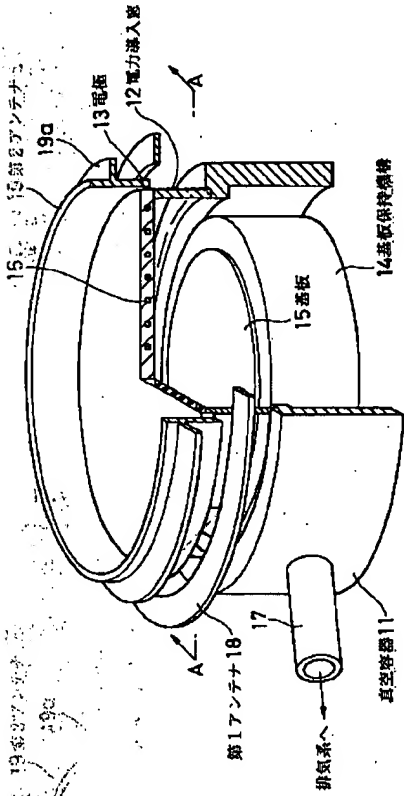
[Claim 8] Plasma treatment equipment given in any 1 term of the claims 1-7 characterized by preparing a magnetic field formation mechanism in the outside of the aforementioned electric discharge container so that a magnetic field may be given to the interior of the aforementioned electric discharge container.

[Claim 9] Plasma treatment equipment given in any 1 term of the claims 1-8 characterized by giving an AC bias, direct-current bias, or the bias that comes to use these together to the aforementioned electrode.

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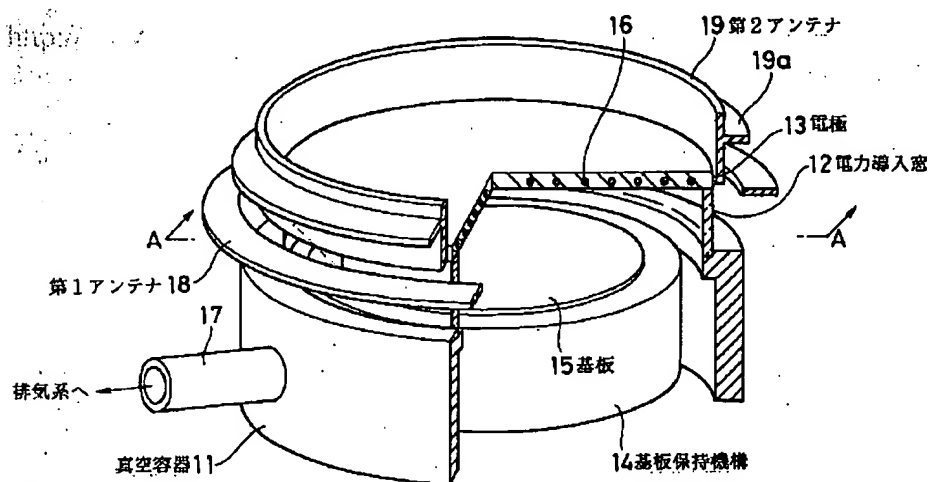
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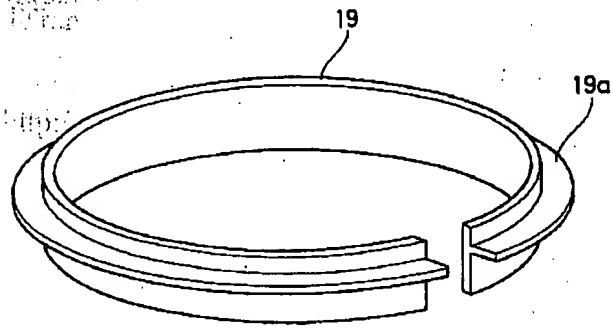
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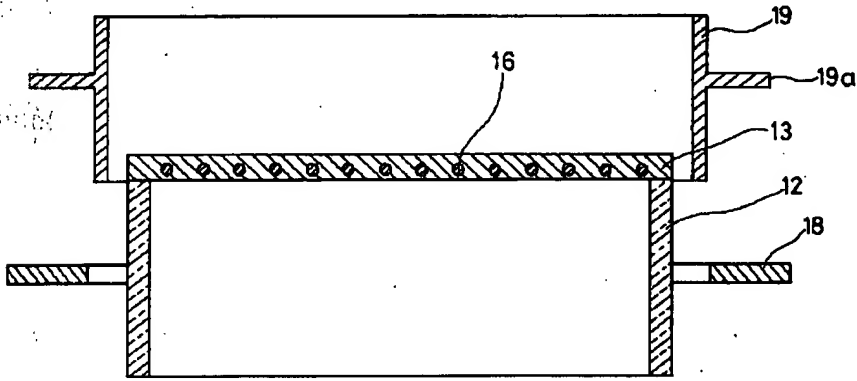
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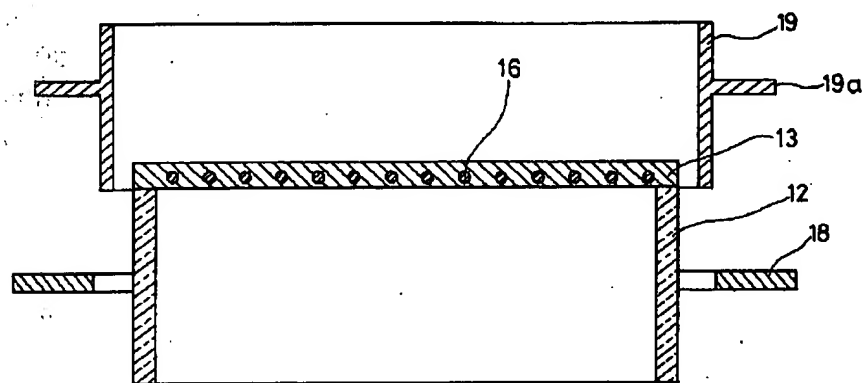


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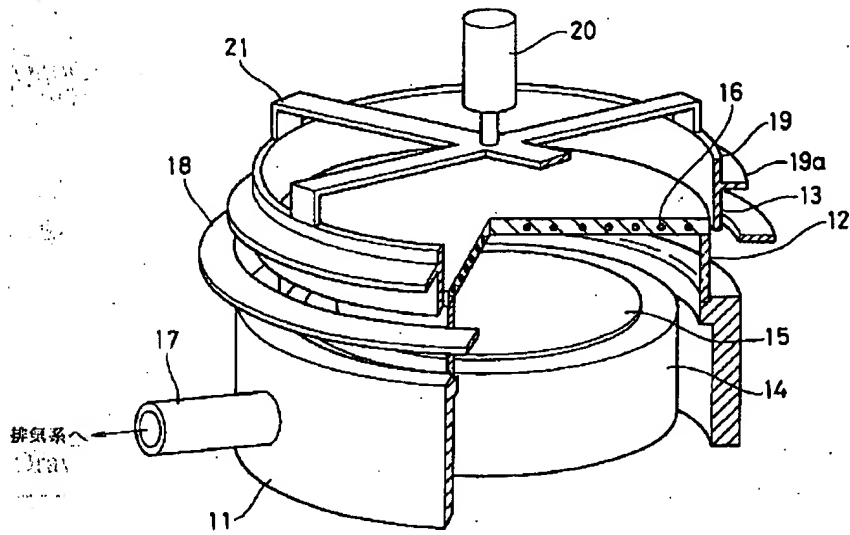
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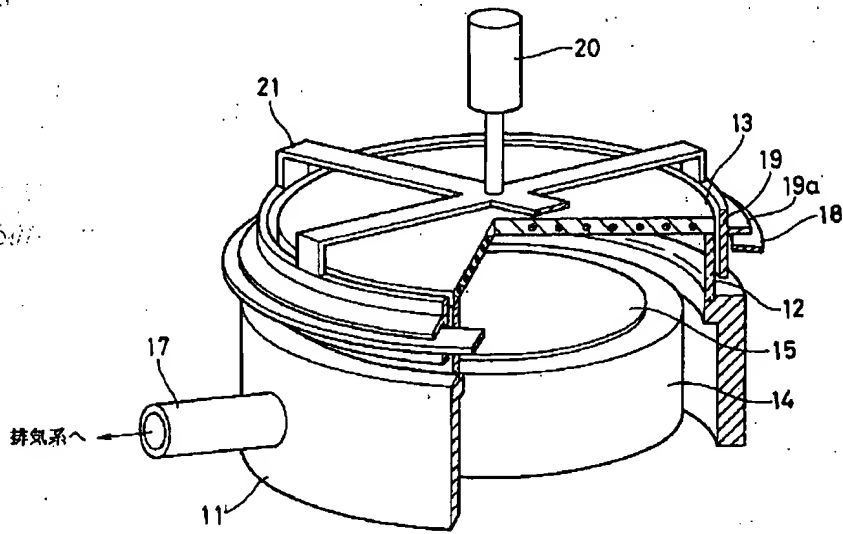
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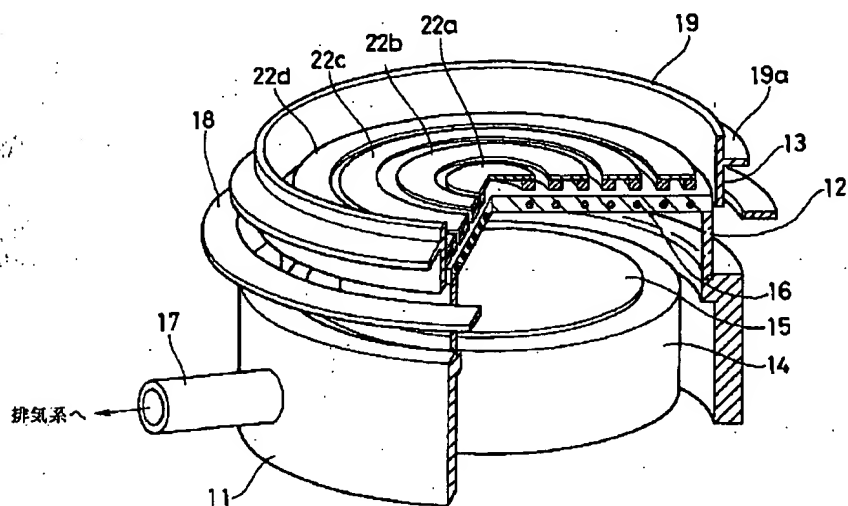
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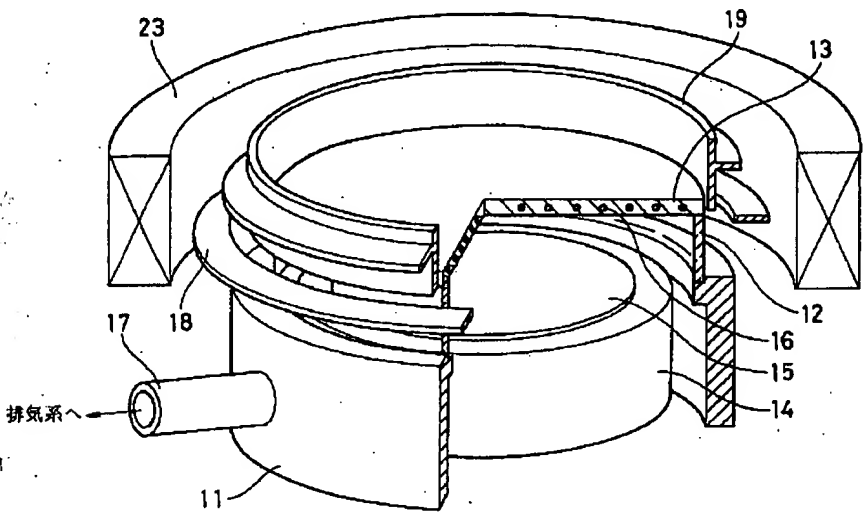


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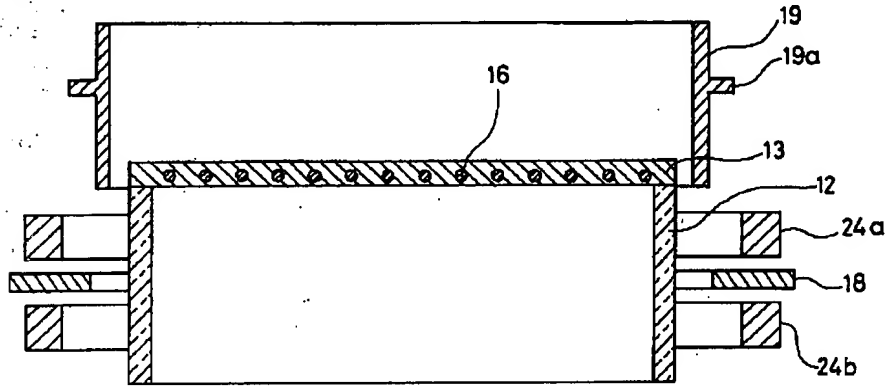


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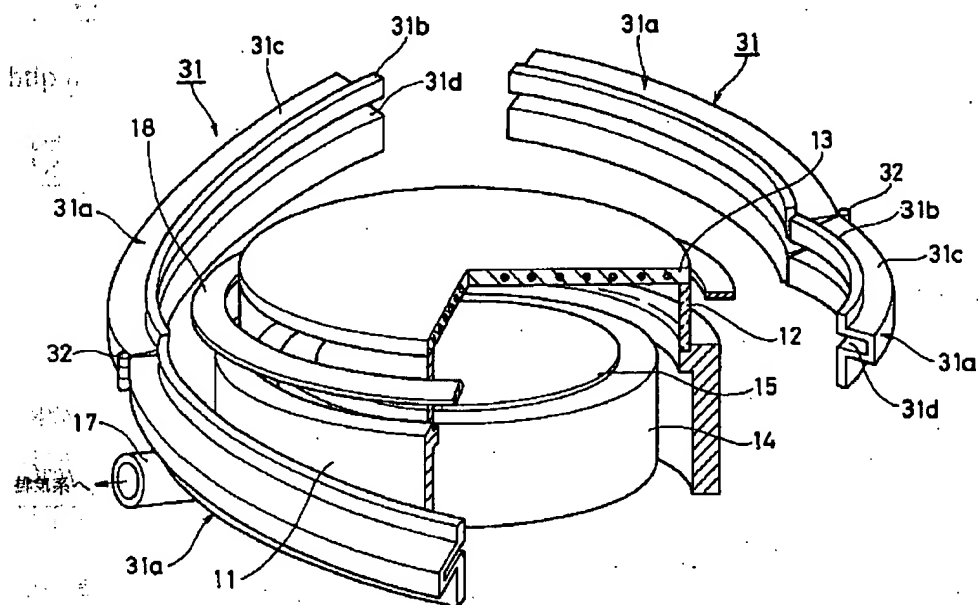


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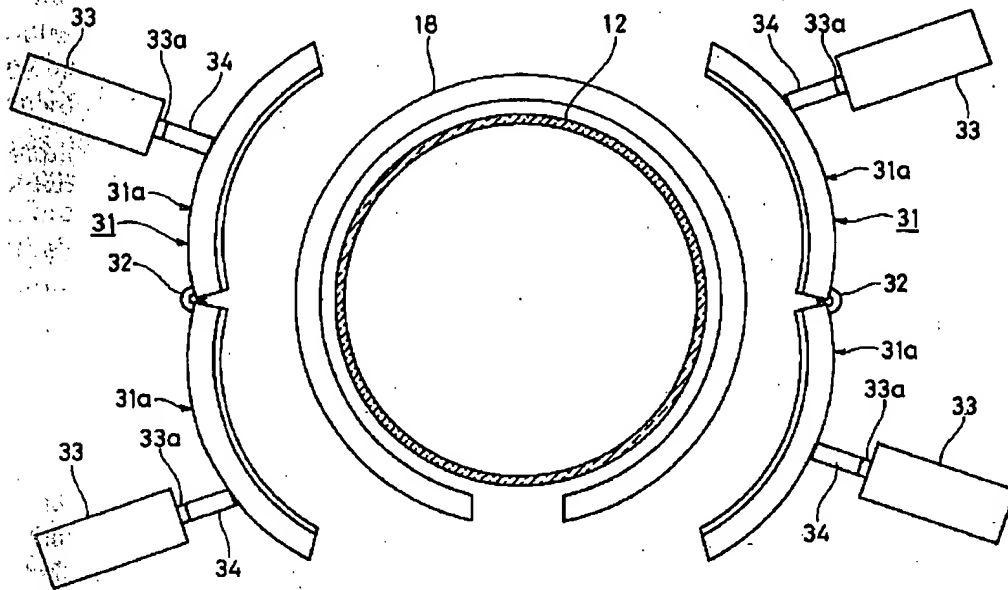


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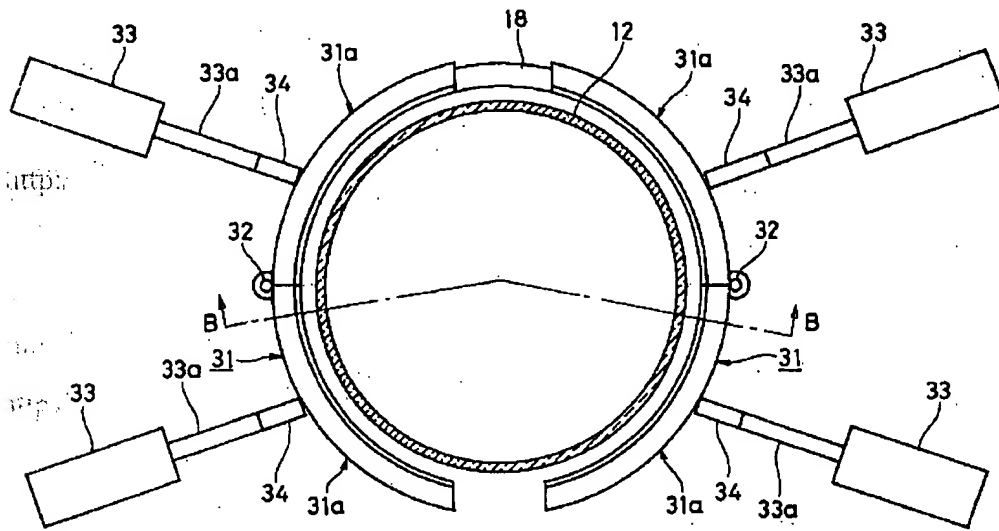




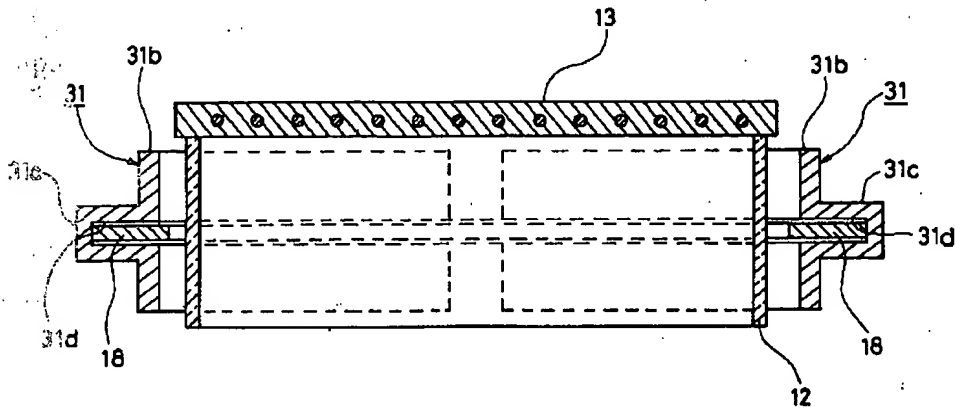
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[Translation done.]



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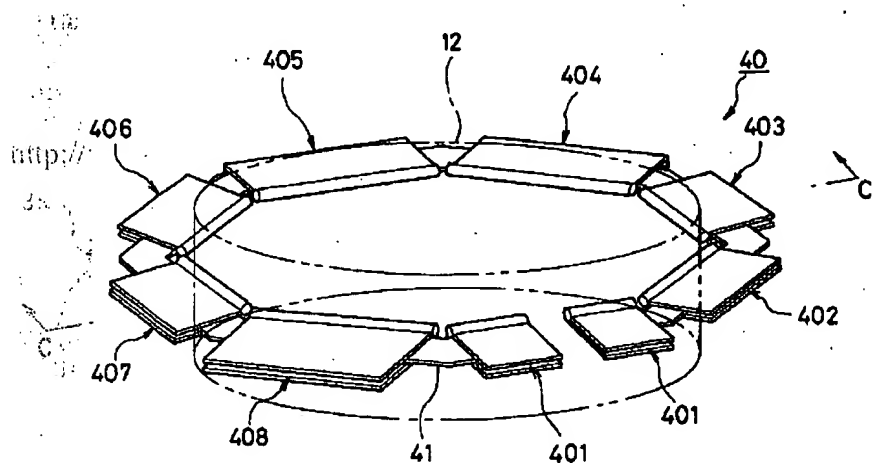
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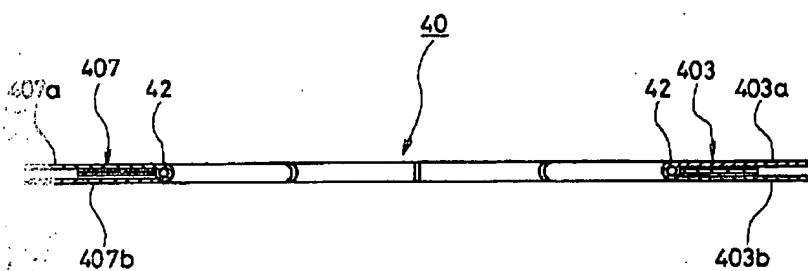
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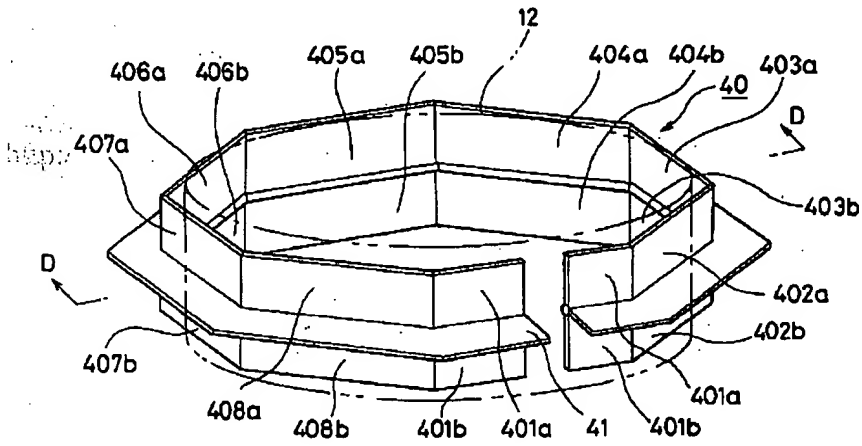
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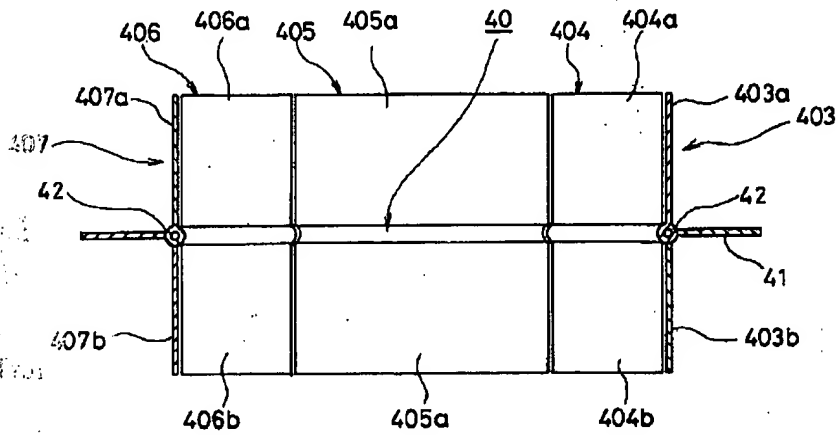


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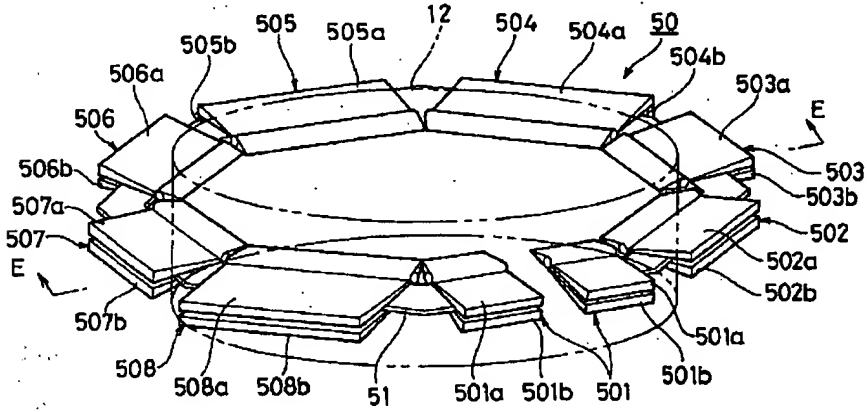


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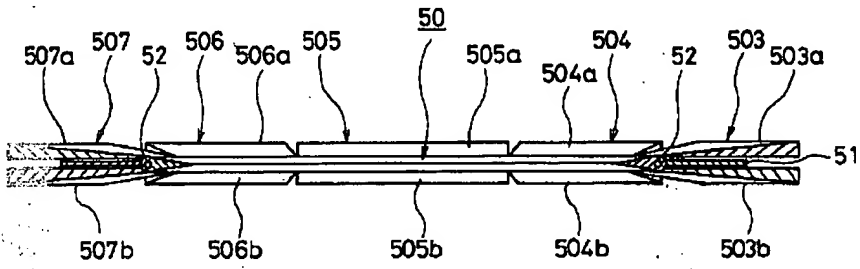
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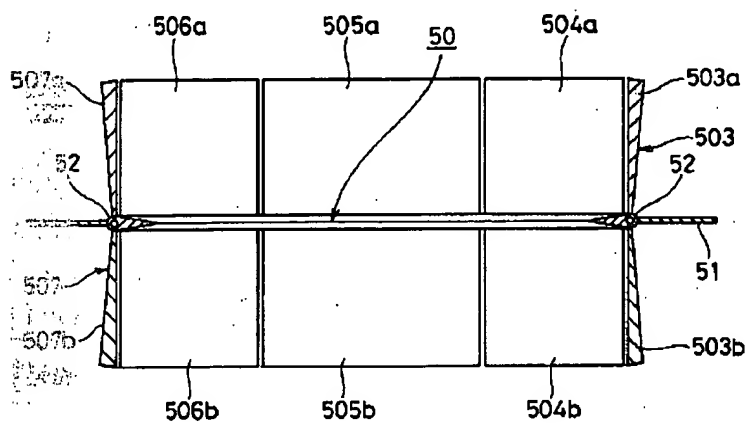


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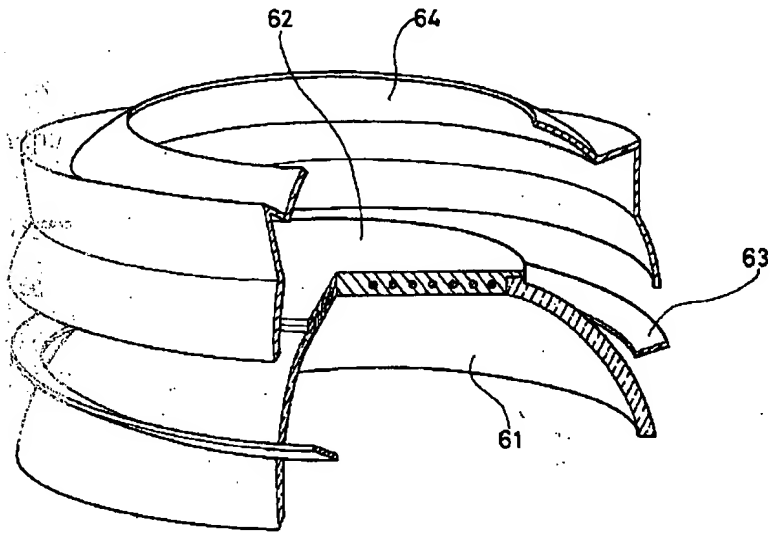


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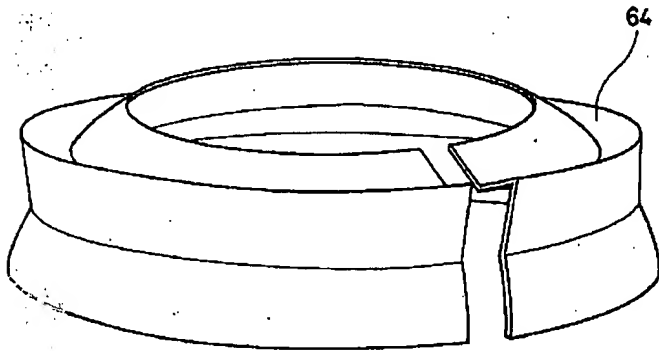


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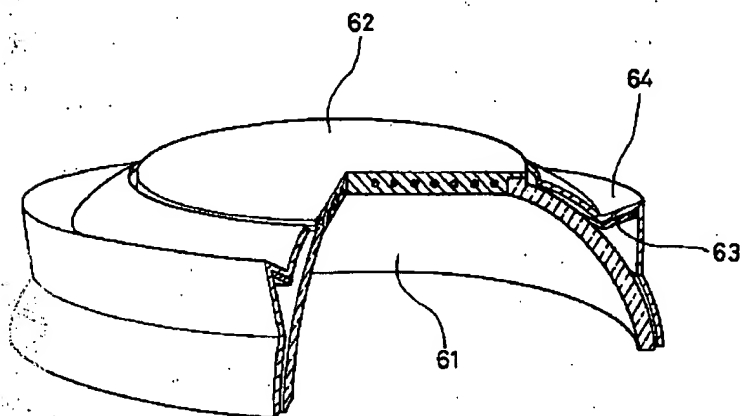
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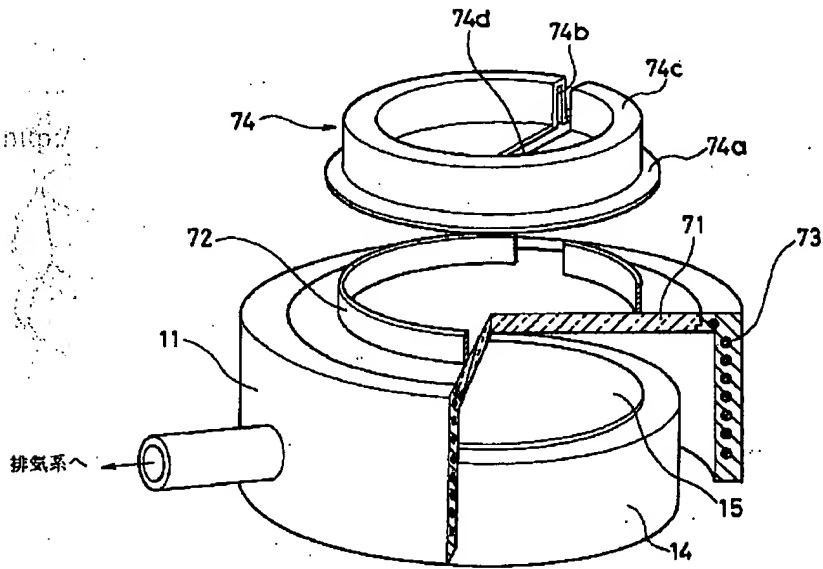


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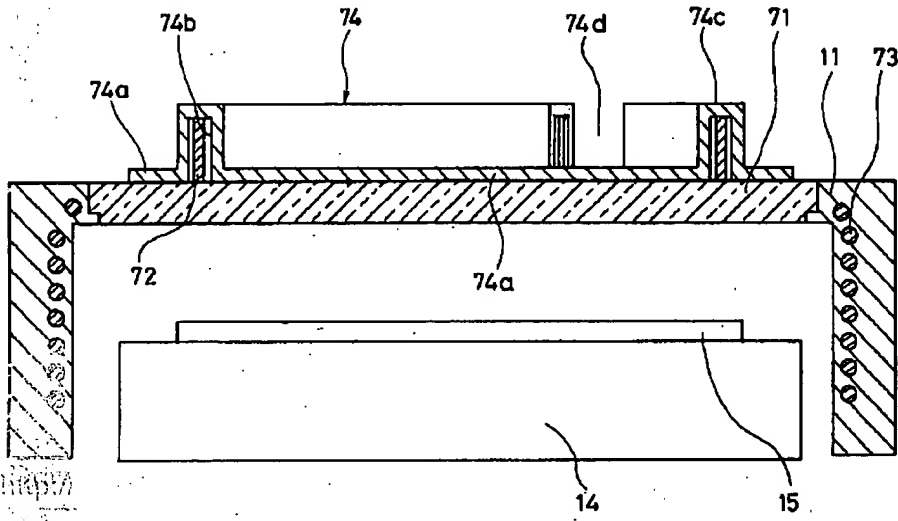
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[Translation done.]



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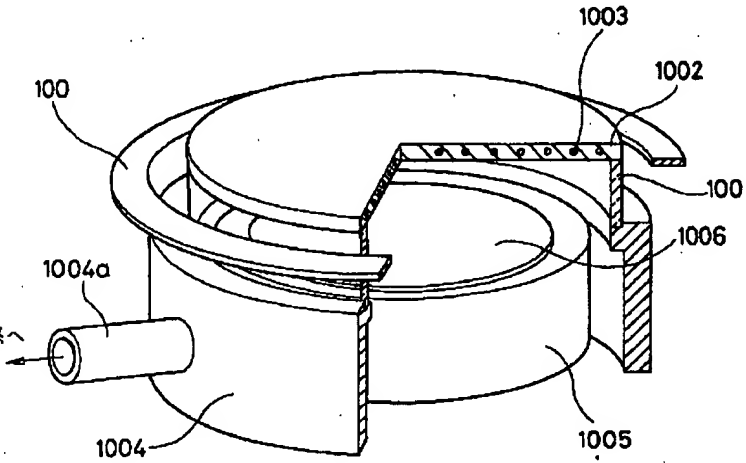
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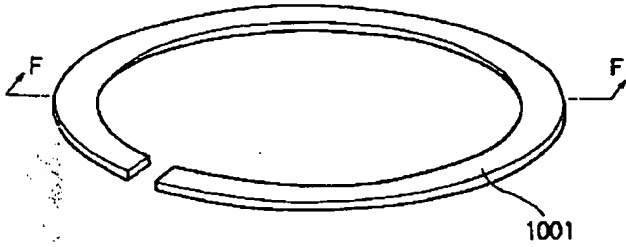
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Drawing selection drawing 27



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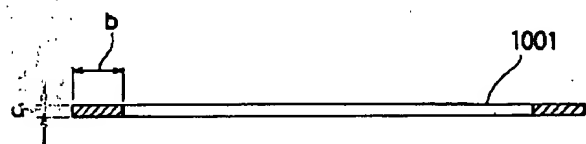
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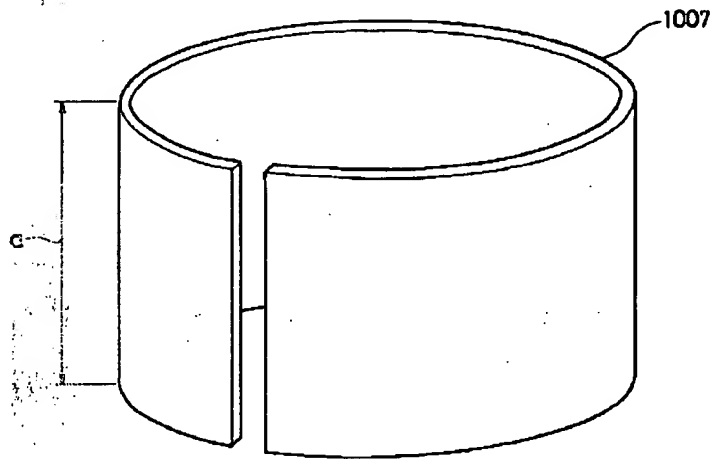
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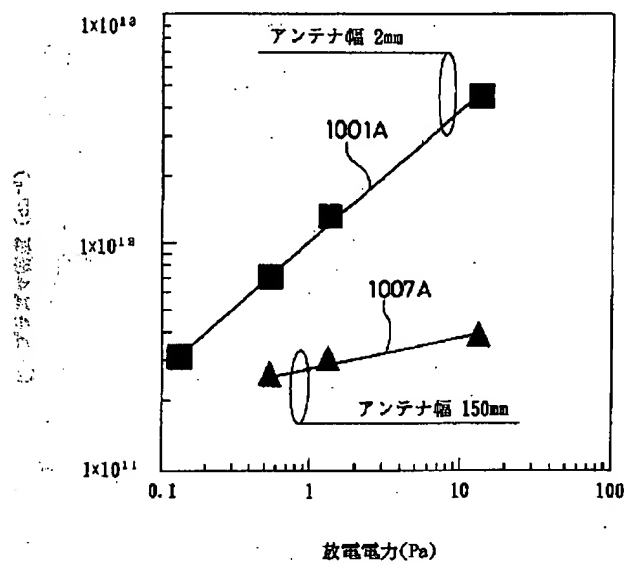
Drawing selection drawing 29 ☒



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放電条件  
放電ガス: Ar  
放電電力: 2000W  
放電容器: φ266×L220mm

[Translation done.]